



## **Consulting Assistance on Economic Reform II**

### **Discussion Papers**

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#### **The Impact of HIV/AIDS on the Education Sector in Southern Africa**

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# **The Impact of HIV/AIDS on the Education Sector in Southern Africa**

Pia Malaney

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## **I. HIV/AIDS and Education: A Two-Way Linkage**

Since the onset of the HIV/AIDS epidemic in Africa the virus has killed approximately 15 million people, and it is estimated that another 25 million people are infected, representing almost three-fourths of the world's HIV infections. AIDS morbidity and mortality is concentrated among working-age individuals, resulting in a devastating impact on human capital resources in the world's most affected countries. The education system, which is the primary mechanism for the development of the future human resources, has not been spared the effects of the epidemic. Not only are enrollments declining as AIDS orphans can no longer afford to attend school, but the loss of teachers and even education administrators to the illness is undermining the very structure of education systems in sub-Saharan Africa.

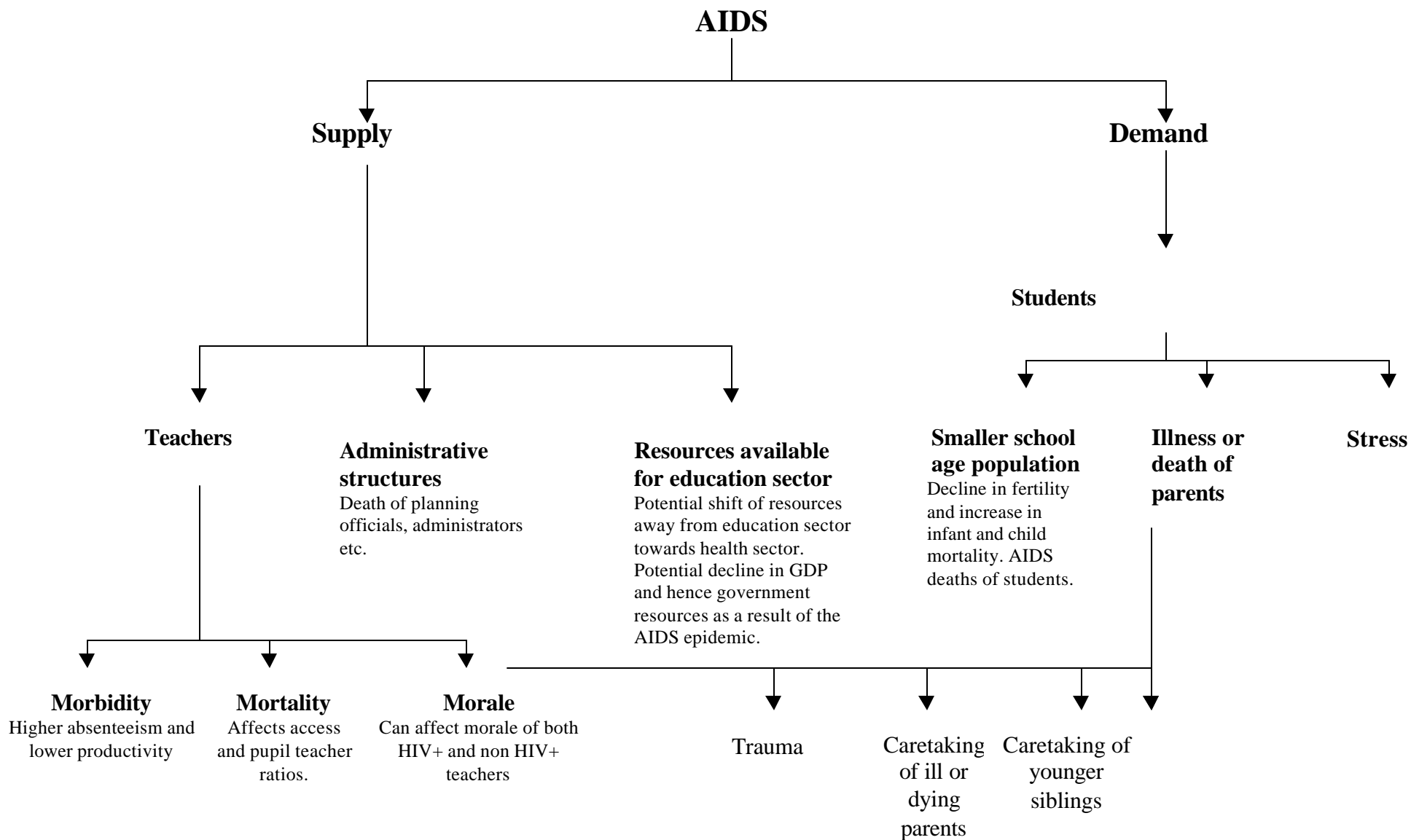
The linkage between the education system and the AIDS epidemic can be seen as a dual one. On the one hand the school system provides a mechanism for the transmission of information about HIV and hence can play a central role in the prevention effort. On the other hand the disease undermines the structure and function of the education system itself. In this study we focus primarily on the latter effect, developing a framework to assess the various aspects of the burden imposed by the disease.

In Section II we lay out the framework to consider the range of effects that AIDS will have on the education sector. Section III develops a model to assess the demand and supply effects of disease on the school system and to project necessary inputs in order to maintain educational quality. This model is constructed to be accessible and reproducible, and allows for modification of parameter values. It is designed specifically to provide insight and understanding of the nature and magnitude of the effects of the epidemic. Section IV presents a case study of the impact of the epidemic in Namibia. We first present quantitative assessments of the extent of the impact on school systems, using the input-output model of Section III. This is supplemented by qualitative data derived from focus groups conducted among schoolteachers and from in-depth interviews with principals.

In Section V we explore the policy options available to governments in the face of the losses presented by the disease. Schools and communities in many countries in southern Africa are already feeling the morbidity and mortality effects of the disease on the education sector. The need for ministries of education to rapidly develop a response to these effects is essential in order to sustain human capital development. For governments facing this impending health crisis it will also be important to keep in mind that the constraint on resources available to the education sector will be severe as health systems begin to demand a greater share of government resources. The issue of cost-effectiveness will therefore play an important role in the consideration of policy options. Section VI concludes.

## **II. The Effects of the AIDS Epidemic on the Education Sector**

One way to view the impacts of the disease on the education sector is within an economic demand and supply framework. The impacts on demand for education come from the effects on the students themselves, while the impacts on the supply of education come from the effects on the provision of education services to students who demand them. Figure 1 provides a schematic for categorizing the various ways in which the epidemic will affect demand and supply.



**Figure 1: The Impact of AIDS on the Education Sector**

## *Demand*

The *raison d'être* of any education system is its students. AIDS affects not only the number of students in school but also their ability to learn in the classroom. We look here at the various ways in which AIDS affects students in the education system.

- a) AIDS will have broad demographic effects in countries with high prevalence. As the primary mode of transmission in Africa is heterosexual contact, the disease disproportionately affects men and women of reproductive age. As these individuals die, overall fertility naturally declines. Furthermore, studies have found that women who are HIV positive are less likely to conceive; fertility rates are estimated to be approximately 30 percent lower among these women. As prevalence rates rise this is expected to have a significant effect on overall fertility. Infant and child mortality can also be expected to rise with overall increases in prevalence as a result of mother-to-child transmission of HIV. Through these mechanisms the epidemic will reduce not only the working-age population but also, as it progresses, the number of school-age children.

A smaller effect will be that of infection among school-age children. In many countries where children begin school at a later age and/or where repetition rates are high, many secondary school students will have entered their reproductive years. As these students become sexually active they will be increasingly exposed to the disease. This appears to be an issue particularly in the case of young girls, as studies have shown that HIV infection rates tend to be considerably higher among teenage girls than boys. Girls from poor families are particularly vulnerable, as they are susceptible to the advances of older men with some amount of disposable income. Focus group discussions in Namibia brought out the importance of the concept of “sugar daddies” in the culture and, even more disturbingly, the non-negligible extent of teacher-to-student sexual contact. Furthermore, evidence from Namibia shows that one of the primary causes of dropout among upper secondary students is pregnancy,<sup>1</sup> highlighting the degree to which unprotected sex is a problem among school-going youth. HIV infection among young people is unlikely to have a significant effect on the size of school-age populations, as the incubation period of the disease is generally seven to ten years. However, it does highlight the need for education systems to provide effective programs for AIDS awareness and prevention.

- b) As parents fall ill and die as a result of the disease there are likely to be many strong and lasting effects on children:
  - The extended illness that infected parents experience will place an increased demand on the time of children for caretaking. With the loss of parents older siblings may also be expected to take on caretaking responsibilities for younger siblings. Rates of absenteeism can be expected to rise. Evidence shows that extensive absenteeism leads to poor performance and increases the likelihood of premature dropout.<sup>2</sup> Once again

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<sup>1</sup> Unpublished data from the Ministry of Basic Education and Culture, Ondangwa East, Namibia.

<sup>2</sup> Weitzman 1997.

there is likely to be a disproportionate impact on girls, as there are asymmetric expectations with respect to caretaking responsibilities.

- The death of a parent can be expected to have deep psychological effects on children. Focus group discussions highlighted the increased time spent by students in mourning for loved ones, and the long-term effects of such trauma on students' ability to learn.
  - There are not only emotional consequences from the loss of parents, but also financial ones. As children are orphaned they often lose their primary source of financial support. Young children are often forced to find work to support themselves and their younger siblings, thereby causing them to drop out of school. There is a growing body of literature discussing the changing nature of family structure in sub-Saharan Africa, as the number of households headed by children increases in the wake of the disease.
  - In many cases orphans are taken in by their extended families. Once again, family structures are being modified across the entire region as grandparents find themselves in the position of taking care of young grandchildren, or couples find themselves raising many more children than they had planned for as they take in the children of dead siblings or cousins. This places considerable financial burdens on families, and they often cannot afford to keep all these children in school. While there has been very little work done on the extent to which the loss of parents affects the ability of children to stay in school, one study that was conducted in Zambia finds that in urban areas 32 percent of orphans are not enrolled in school compared to 25 percent of nonorphans. In rural areas 68 percent of orphans are not enrolled compared to 48 percent of nonorphans.<sup>3</sup>
- c) Even for children who do not lose parents to the disease, the environment of increased mortality can create considerable stress as they lose members of their extended families, attend ever more funerals, and witness the effects of the disease on their peers.

## *Supply*

As evidence from some of the most affected countries (e.g., Zambia) shows, the epidemic has already begun to seriously disrupt the educational system and the ability of governments to provide access to quality education. This will intensify as the epidemic progresses. We discuss here some of the ways in which the epidemic can affect educational systems.

- a) As the epidemic progresses the number of people with AIDS will increase rapidly, and morbidity and mortality rates will continue to rise. The number of hospital beds, which are already being increasingly committed for the care of AIDS patients, can be expected to fall short, and the demands on the health sector will increase dramatically. It was estimated that in 1997, in at least seven African countries, public health spending on AIDS alone exceeded 2 percent of GDP.<sup>4</sup> The pressure to shift resources away from other government services,

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<sup>3</sup> UNAIDS 1999.

<sup>4</sup> UNAIDS Fact Sheet on AIDS in Africa.

including education, and toward health care can be expected to increase, limiting the resources available for the education sector to deal with the impact of the disease. Overall government resources can also be expected to decline with falling per capita GDP as a result of the disease and its disproportionate impact on the working age population.<sup>5</sup>

Within the education sector itself there will be a financial burden, as governments will need to compensate teachers who are terminally ill and unable to work. Many governments also provide death benefits and other compensation, and will find the cost for such compensation increasing as mortality rates increase.

- b) With rising AIDS mortality the education sector will be faced with attrition in the ranks of its planners and administrators at all levels. Even if these personnel are replaced there would be a considerable loss of experience, which can be expected to have an effect on the functioning of the system.
- c) Perhaps the greatest burden on the education sector will be the increased rates of morbidity and mortality among teachers. It has been speculated that teachers are particularly vulnerable to the disease for a combination of reasons. First, they are often placed in schools away from their hometowns, and lack of housing facilities frequently requires that they live alone, leaving their families behind. Second, they generally have higher levels of disposable income than the general population. These factors combined can increase the likelihood of risky behavior. Initial evidence from Zambia supports this observation, showing a mortality rate among teachers of thirty-nine per one thousand—70 percent higher than the mortality rate among those aged fifteen to forty-nine in the general population.<sup>6</sup> Increasing AIDS-related morbidity and mortality can be expected to affect teachers in the following ways:
  - Terminally ill AIDS patients generally suffer long periods of ill-health before death. Infected teachers often have increased periods of absenteeism that continue until they can no longer work. Even when they are in the classroom, increased morbidity during this period can affect productivity.
  - Perhaps the greatest cost to education systems will be the high rate of teacher attrition due to AIDS mortality. There has been an attempt in most African countries to lower pupil-teacher ratios. While the epidemic will cause a decline in the number of students enrolled, the impact of teacher attrition could outweigh that. Larger schools may cope by having other teachers substitute in the short term, or by combining classes. Strategies like this will once again affect the quality of education.

The problem is even greater for the number of rural schools across Africa that only have one or two teachers. The loss of a teacher in such a case can completely deprive students in that area of access, undermining the attempt of many countries to achieve the goal of “education for all.” The issues of access and quality of education will be discussed further in Section V.

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<sup>5</sup> McPherson and Hoover 2000.

<sup>6</sup> Kelley 1999.



- Even before HIV-positive individuals begin suffering from AIDS-related morbidity, the knowledge of their seroprevalence status can cause acute psychological trauma. Feelings of hopelessness and frustration that often accompany knowledge of infection will undoubtedly affect the focus and productivity of some teachers. Even among teachers who are not infected, morale can be highly compromised. Already, rates of absenteeism are higher as teachers take time off to attend funerals and mourn lost friends and family members. In many cases teachers are being forced to take on the role of counselors, as children are faced with the loss of family members and have nowhere else to turn. As these factors play into teacher morale they will increasingly affect the education process.

### **III. Modeling the Impact of HIV/AIDS on the Education Sector**

In order for ministries of education to understand the full extent of the burden that they will face as a result of the epidemic, and to find ways in which to deal with this burden, it is necessary to have estimates of the impacts that the disease is likely to have on demand for schooling and supply of inputs such as teachers. Appendix 1 presents a template for an input-output model that can be used to estimate the impact on enrollments and on teacher attrition. This is a slightly modified version of the model developed by Al-Samarrai (1997).

The first step in the estimation process is to model the demographic impacts of the AIDS epidemic. This is done quite simply through the use of readily available software. This study used the SPECTRUM System of Policy Models prepared by The Futures Group International in collaboration with Family Health International. This software can be downloaded free of charge from the website <http://www.tfgi.com>.

The AIDS projection requires first developing a demographic projection. In order to do this one needs data on the number of people by age and sex in the base year, current-year data and assumptions about the future rates of total fertility, age distribution of fertility, and life expectancy at birth by sex.<sup>7</sup> Such data are generally available through national statistics bureaus or through the United Nations or the U.S. Census Bureau. An appropriate life table must also be selected.

The AIDS projection module, AIM, can then be used to calculate the impact of the disease. This requires an estimate of future levels of HIV prevalence. It also requires assumptions about the following parameters:

- i. The start year of the epidemic
- ii. The perinatal transmission rate
- iii. The percentage of infants with AIDS who die in the first year of life
- iv. Life expectancy after AIDS diagnosis
- v. The reduction in fertility related to HIV infection

It should be noted that the program provides a well-researched set of defaults for all these parameters.<sup>8</sup> DemProj and AIM together allow us to calculate age-specific populations with and

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<sup>7</sup> Stover and Kirmeyer 1997.

<sup>8</sup> Stover 1997.

without AIDS to assess the burden of the epidemic. They also calculate the number of orphans, the age-specific mortality, life expectancy, and various other demographic variables that are affected by the disease.

The demographic data can then be used to calculate the flow of students and teachers under two scenarios: the absence of the AIDS epidemic and the presence of the epidemic. Part A in the model template presented in Appendix 1 allows us to calculate enrollments in each grade. This can be calculated in a without-AIDS scenario and a with-AIDS scenario. The first input that is required is the estimated projected population of the age at which children generally enter Grade 1, e.g., the estimated number of six-year-olds for every year of the projection. The with-AIDS scenario will have a lower population in this age group as a result of factors described in the previous section such as lower reproductive age population, lower fertility rates among HIV-infected women, and higher infant and child mortality rates. We then need gross enrollment rates for Grade 1 for the base year and the promotion and repetition rates for each grade. Based on this data the model allows us to calculate changing enrollments over time.

The effect of AIDS on orphan attendance will be reflected in lower gross enrollment ratios and higher dropout rates when calculating the with-AIDS scenario. Calculating this impact presents one of the biggest challenges to estimating the burden on the education sector. There are as yet extremely few studies done that assess the subsequent enrollment and dropout rates of children orphaned by AIDS deaths. As mentioned in the previous section, one study in Zambia finds that in urban areas 7 percent fewer orphans attend school than nonorphans, while in rural areas almost 20 percent fewer orphans attend school.<sup>9</sup> Another study conducted in Namibia surveyed 133 orphan households. Out of these, 67 percent of the households reported that all school-age orphan children were still in school (though 64 percent said that school fees and related costs represented a significant financial burden); 11 percent reported that no school-age orphans were in school; 12 percent reported that some orphan children in the household were in school while others were not; and in 10 percent of the households a response was not available.<sup>10</sup> It should be noted that average enrollment rates in Namibia, at 87 percent, are fairly high.

As discussed earlier, gender may play a role in how AIDS morbidity and mortality among parents affects dropout rates of children. If girls are more likely to be expected to take on caregiving roles, then we may expect to see a discrepancy between the dropout rate of boys and of girls come into play as girls reach the age of nine or ten, which is when they are considered old enough to take on these responsibilities. The data do not exist as yet to carry out this calculation. However, the model can easily be modified to take it into account.

Part B of the model allows us to input the impact of AIDS on teachers. In order to calculate the level of attrition in teachers as a result of AIDS mortality it is first necessary to calculate the nondeath attrition rate. Data on the reasons for teacher attrition will be required, allowing the calculation of nondeath attrition as a percentage of total attrition. The simplest assumption to make is that this rate stays constant over time, though it could potentially be modeled as a function of training and other factors. The mortality rate for those aged twenty to fifty-nine (or the appropriate age group to represent teachers) can then be applied from the demographic

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<sup>9</sup> UNAIDS 1999.

<sup>10</sup> Steinitz 1999.

projection model in the with-AIDS and without-AIDS scenarios. As discussed in the previous section, there is preliminary data suggesting that mortality rates are higher among teachers, but until further data are available it seems appropriate to assume that mortality rates in this occupation are equivalent to the general population.

In order to calculate the supply of teachers it will be necessary to make some assumptions about the number of new teachers entering the system every year. It is possible to use a model to predict the supply of teachers by assessing the number of entrants into teacher training colleges and diploma programs each year, as well as repetition and promotion rates.<sup>11</sup> However, the actual supply will be dependent on the training and education requirements of the country.

The total supply of teachers is calculated here by taking into account the current number of teachers, the annual attrition rate, and the annual supply of new teachers. This can then be compared to the primary and secondary enrollments to calculate the effect the epidemic has on overall pupil-teacher ratios.

While overall pupil-teacher ratios are one of the most prominent targets used by education ministries when measuring quality of education, it is critical to note that this ratio is simply an average and that averages are often misleading. An overall pupil-teacher ratio can hide wide disparities across regions. For example, low pupil-teacher ratios in urban areas can pull down country averages, often hiding extremely high ratios in rural areas. It might therefore be important to break down the analysis to a lower unit of resolution than national-level analysis. The case of Namibia, which is discussed in further detail in the next section, brings out the importance of taking these disparities into account. Pupil-teacher ratios are considerably higher in the northern regions of the country. HIV prevalence rates are also significantly higher in these regions. In such cases a national level analysis will obscure the acute burden that will be felt in classrooms in these regions.

Of particular concern when thinking about education in sub-Saharan Africa is the high number of rural schools with only one or two teachers. In larger schools the loss of a teacher can often mean that the other teachers will carry the teaching load during their open periods, or that classes will be combined. As will be discussed in Section V, such a response can have negative impacts on educational quality. However, the impact on a one-teacher school will be discretely different. If it entails closing the school down then students will lose access entirely. It is therefore important to assess the impact on these schools differently. While the data may not as yet be easily available it is essential to gather them in order to undertake this analysis.

It should be noted that this model does not take into account the impact of morbidity on productivity. Once again, there appear to be little or no data available that would enable such a calculation, and until such time as the data is gathered any estimate is likely to be highly speculative. We also do not take into account the loss of education planners and administrators.

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<sup>11</sup> Al-Samarrai (1997) provides a model to perform this calculation.

While the burden of this loss can indeed be expected to be severe, it is also likely to be highly nonlinear and we do not attempt to model it here.<sup>12</sup>

#### **IV. Namibia: A Case Study**

Namibia is one of the four countries most affected by the AIDS epidemic. While the first HIV/AIDS case in Namibia was not reported until 1986, the disease spread quickly, and by 1998 more than 53,000 cases had been reported.<sup>13</sup> In 1999 alone, 14,866 new infections were reported.<sup>14</sup> As most infected persons do not get tested, this represents just a small percentage of true infection rates. Results from the 1998 HIV sero-survey among pregnant women show 17.4 percent testing positive for HIV. Once again, this average hides a fairly wide regional and socio-economic divergence. Infection rates in the region of Oshakati, in northern Namibia, have been estimated to be as high as 34 percent.<sup>15</sup>

The concentrated impact of the epidemic on the working-age population has serious demographic consequences that directly affect the education sector. Mortality rates for those aged twenty to fifty-nine are projected to increase from 4.1 per 1000 in 1996 to over 40 per 1000 in 2010.<sup>16</sup> While there will be corresponding declines in other age groups, as discussed earlier, the magnitude of the impact among the working-age population will have significant effects on the overall age structure of the population. In this section we discuss the results of applying projections of the demographic impact of the AIDS epidemic to the model template discussed in the previous section.

In order to assess the impact of the epidemic we first calculated estimated enrollment rates and number of teachers in a without-AIDS scenario. We assumed that admission, repetition, and enrollment rates stayed constant at 1996 rates. The official age for Grade 1 entry in Namibia is six years. However, a significant percentage of children do not enroll until age seven. We therefore worked with gross enrollment rates. Data on actual number of teachers were available until 1999. Beyond that we projected the number of teachers by incorporating assumptions on the attrition rate of teachers and the supply of new teachers. The Ten-Year Plan for Educator Development and Support in Namibia finds that the combined 1998 diploma and degree output of the colleges of education and the faculty of education at the University of Namibia is 1000.<sup>17</sup> We assumed, therefore, that the supply of new teachers remains constant at 1000. In order to calculate the attrition rate of teachers we used the percentage of attrition that was from causes other than death, which was 6.3 percent of total teachers. We then included the attrition due to death, which was taken to be the average death rate for those aged twenty to fifty-nine in the without-AIDS scenario.

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<sup>12</sup> McPherson and Hoover (2000) discuss the consequences of non-linearity of the impacts of the AIDS epidemic. While such effects may indeed represent a considerable problem for the education sector, it is not a simple one for planners to anticipate, and is not within the scope of this analysis.

<sup>13</sup> Republic of Namibia 1999.

<sup>14</sup> Republic of Namibia 2000.

<sup>15</sup> Ibid.

<sup>16</sup> Working ages are generally assumed to be fifteen to fifty-nine. However, we use the age group of twenty to fifty-nine to correspond more closely with the age group from which teachers are drawn.

<sup>17</sup> Coombe et al. 1999.

This estimation finds that in order to achieve the Ministry of Education's target of a pupil-teacher ratio of 34:1 in primary schools and 28:1 in secondary schools, there is in fact a surplus of teachers currently being produced. Once again, these averages do not take into account the considerable regional and intraregional disparities in the country, hiding the fact that pupil-teacher ratios are in fact much higher in some regions and even more so in particular schools within these regions. However, they are in keeping with evidence from Namibia that graduates from teaching colleges are sometimes unable to find jobs. Even in the without-AIDS scenario the situation will soon change, and if the number of teachers being produced does not increase, there will be a projected shortfall of teachers as a result of population growth. At the current rate of production the shortfall is projected to reach 6,548 by 2010.

In order to project enrollments in the with-AIDS scenario we needed to take into account changes in the population structure and increased dropout rate among AIDS orphans. With-AIDS population projections for age six were used. Based on the previously discussed study of orphans in Namibia, we assumed that the average enrollment rate for orphans was 78 percent as compared with an overall average of 87 percent in Namibia. The demographic projection calculates the total number of orphans from birth to age fifteen. We assumed that the percentage of children orphaned was evenly distributed, thereby providing us with the number of school age children orphaned. Taking into account lower enrollment rates for an increasing number of orphans we found that total enrollment rates decline to 86.4 percent in 2005, and 85 percent in 2010. In order to calculate the number of teachers we assumed that the nondeath attrition rate remains constant at the same level as in the without-AIDS scenario. We then incorporated attrition due to death, which was taken to be the mortality rate for those aged twenty to fifty-nine in the with-AIDS scenario.

In the case where the supply of new teachers remains constant at 1000, we found that the shortfall in teachers in the with-AIDS scenario by 2010 is 7,161. While the difference between the with-AIDS and without-AIDS scenarios is not extremely large, the impacts are likely to be considerable in areas that have particularly high infection rates, such as the northern regions of Ondangwa East and Ondangwa West. This is further exacerbated by the fact that pupil-teacher ratios are already particularly high in these regions. Unless the Ministry of Education is able to increase the number of teachers it is training from highly affected regions, the impacts of the disease will likely affect its ability to achieve its target pupil-teacher ratios in these regions, with resulting effects on access and quality of education.

It should also be noted that based on data constraints, this assessment does not take into account the differential impact on small schools. Much of the results in the with-AIDS scenario are being driven by the drop in the number of students enrolled as a result of fertility declines. Therefore, though teacher attrition from AIDS mortality is high, average pupil-teacher ratios are not declining greatly. While the average pupil-teacher ratio may be a more appropriate measure in a school that has more than one class per grade, it is particularly misleading for smaller schools. Take a simplified example: in a school with ten grades, one teacher for each grade, and a pupil-teacher ratio of thirty four, a ten percent decline in students and teachers will not change the pupil teacher ratio. However, while the loss of thirty four pupils may be spread out over the different grades, the loss of one teacher will represent a discrete problem for one grade. This problem is naturally not incorporated in the pupil-teacher ratio. This problem is of course

magnified in one- and two-teacher schools. Data on small schools are therefore especially important for ministries of education to gather and analyze, as the impact on access in case of teacher attrition in such situations is especially severe.

### *A Qualitative Assessment of the Impact of AIDS on the Education Sector in Namibia*

In order to understand the impacts of the disease as they are perceived by individuals directly affected by the epidemic, we conducted focus group research with schoolteachers and in-depth interviews with school principals in the Ondangwa East and Ondangwa West regions of Namibia. These are among the most densely populated regions of the country, and have the highest rates of HIV sero-prevalence as indicated by antenatal sero-surveillance data. This research highlighted the extent to which some of the effects previously discussed are already being felt within schools, and also the extent to which there is a resistance to thinking about the long-term impacts of the disease.

Both the focus groups and the interviews indicated that there is indeed a high level of awareness of the disease. All the participants knew what the disease was, and agreed that it was a problem within their communities. However, it was also pointed out repeatedly that there is a considerable stigma associated with the disease. Even though communities were beginning to experience rises in death rates, many participants indicated that there was a resistance to admitting that it was AIDS-related:

“Even when they are sick, some said no, they are patient of malaria, somebody has TB, somebody has fever. But if you see the truth, it's HIV. It's AIDS. But we are afraid to say you have AIDS.”

—28-year-old male teacher

“The doctors say it is malaria. He's died of malaria. They cannot speak of that it is AIDS. Because if he said, this teacher died because of AIDS, his child or his wife are not safe in the community. . . . They feel they are not accepted by community.”

—35-year-old male teacher

“It's a problem for many [people], especially young people. Or those who are married. They have a problem if they know a man sinned or find out that he has HIV or AIDS. Some are hanging them. Or can burn their house. That's a serious problem. Young people, they hang themselves if they find out or if they heard it from the nurse or from the doctor.”

—Principal

“If you go to in hospitals, especially in Oshakati, you will see this. That people are dying. The information was given us that this AIDS is the disease of ‘morphi’ [homosexuals]. They say those people are going to die for AIDS is morphi.”

—32-year-old male teacher

As a result of the extreme stigma associated with the disease none of the teachers wished to admit that there had been any losses as a result of AIDS within their own schools, though principals sometimes contradicted that claim. This was perhaps one of the strongest themes to emerge from the focus group discussions. Schools and communities were not in a position to think broadly and constructively about dealing with the impacts of the disease, as they did not feel comfortable acknowledging it.

While teachers were willing to discuss the impact on schools in a broad sense, as well as the effects that they were witnessing on their students, none would admit that HIV/AIDS had directly affected themselves or any of their colleagues, and that they would therefore need to consider establishing coping mechanisms. It was apparent that as yet no particular coping mechanisms had been developed in response to the disease. When a teacher fell ill, the class was taken on by another teacher, combined with another class, or left untaught. This had clearly begun to present a problem for schools:

“It's a lot of learners, one teacher. You have 60 to 70 learners in one class. And according to the methods we are using now, this Learner Center approaches, I think it's impossible. It's impossible.”

—Principal

Principals stated that in the case of the death of a teacher they reported it to school inspectors, who would arrange for another teacher to be appointed. The supply of teachers was sufficient, so this did not technically present a problem. However, there was often a long waiting period before the post was filled, especially in more remote regions. Lack of housing and other facilities were pointed to as a major cause of this difficulty, and the implications of the problem for further spread of the disease were also not lost on school principals.

“Some are come from far and they seek some places where they can stay during the school time. And holiday or weekend they go back to their houses. This causes a problem. If somebody is married or has a house, then you separate a family now. It's that problem. Some of the teachers become lonely because they are separate from their houses. And this is difficult.”

—Principal

Many principals also pointed out that when a teacher was terminally ill with the disease, they could not apply for someone to fill the post until at least six months of absence. This presented a bureaucratic problem that several principals requested be modified.

Even while there was a sufficient supply of teachers to replace losses, teachers indicated that there was an impact on education quality as a result of both an experience loss and the stress such transitions placed on students:

“Some of the schools have lost teachers due to this disease. Even the secretaries are exposed. Some of the schools have lost those kinds of people at their school. Eventually after a year or two, they are replaced with another teacher or another secretary. But they are not the same as the ones who have died. They cannot teach or do the work as well the one affected by AIDS. And also the learners, the learners used to know their teachers very well. Even when you enter the class, if you are not good that day, they can just say, ah, you are not feeling good today. But they love their teacher. They know the teacher very well. They know their teacher, even the handwriting. But if that teacher dies and is replaced by another teacher, I think they won't feel good, that they will be upset by it.”

—29-year-old female teacher

While no teachers were willing to admit that any of their colleagues had been affected, they did talk openly about the impact on their students. In Namibia schooling is officially free, and it is therefore illegal for schools to charge school fees. However, the government provides only enough resources for the most basic necessities, and in order to ensure smooth functioning of the school, principals rely on “school funds,” which are collected from the students. While paying into these funds is technically voluntary and students in need can request to be excused, in practice there is a strong incentive for principals to enforce payment. Schools also generally require uniforms, and while wearing these is also technically voluntary, the stigma attached to noncompliance is significant. These factors, combined with other costs such as examination fees and textbooks, represent a considerable financial burden for students, contributing to dropout rates especially among orphans.<sup>18</sup>

Teachers also talked about the stress on students of losing one or both parents. According to some, absence from school for the official mourning period was generally followed by periods of reduced performance. The general family responsibilities that students were required to take on were also implicated as a factor in low attendance and concentration. Issues of discipline with changing family structures were highlighted as a major issue:

“You know when parents die and the child becomes an orphan. And then he or she has to take care of the others. They are forced to take care of them if the grandmother is old or the grandmother dies. Then the elder child, especially if it is a girl, has to take care of the brothers and sisters and the grandchildren. Sometimes she can leave school to take care of the others, and sometimes the child does come to school but she or he doesn't have any concentration, because she is just thinking of what they're going to do at home, what they are going to eat, where will they get clothes, or other things.”

—35-year-old female teacher

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<sup>18</sup> Steinitz 1999.



“Because mostly the people who die are the economically able one. They die and they leave their kids behind. There are grandparents that take care of those kids. Sometimes the gap between the grandparents and the kids is so huge that sometimes there is a clash in values. Because sometimes the grandparents are old people and the kids have kind of modern ideas. Yes, so it is difficult for them to control the kids. Sometimes the older kids have to take care of the smaller kids, and these older ones are suffering because they have less time to study because they have to do the chores after school, get water, cook for the kids, get the wood, and so on. Mostly also the small kids don't respect the older kids because they see them as kids themselves anyway. So it's like this: discipline is also getting out of hand because there is no somebody who can say ‘stop this and do this’.”

—46-year-old female teacher

The impact of the disease on the psyches of young people was brought out most starkly by a teacher discussing the response of students not just to the death of a parent, but also to the overall atmosphere of loss:

“Something which is remarkable is that you see, let's say, the school requires to ask the learners about their future and their hopes, particularly when you want to ask them what are you going to be when you finish this school. Some are telling you that, okay, me, I want to be this, me I want to be a police. Some are saying, me, sick. I don't know what am I going to be in the future, Then you ask them, why? It's because I'm going to die soon, because people are dying.”

—32 year-old-male teacher

Teachers also discussed the gender imbalances in the ways in which the disease was affecting young people, pointing out the inequities within the culture and their effects on schooling:

“In our tradition we believe that the woman is the one who is supposed to prepare the food, to clean the house, to collect water and the wood. And the boy is just looking after animals.”

—27-year-old female teacher

“If there is a shortage of money the girl child stays behind and the boy child goes to school. Even if a girl is more intelligent. And I think they are also the ones who are more emotional and that can also affect their performance in school.”

—38-year-old female teacher

There has been some attempt to use the school system in Namibia as a mechanism for transmission of information about HIV and AIDS. Discussion of HIV/AIDS is officially included in the curriculum under a category called Life Skills. However, this is not a subject that is tested formally, and the general societal taboo against discussing such issues translates into a lack of desire among teachers to raise the subject in classrooms. One principal described the problems they experienced:

“We have a problem, as teachers. We want to educate people....We have given books and condoms here. And some of the learners want those condoms and books to read, but some of the parents say, ‘oh, those teachers, they are trying to educate our children to make sexual.’ That truly is not so.”

— Principal

There is a widely respected UNICEF program in Namibia called “My Future is My Choice” that deals with AIDS awareness and prevention among adolescents. However, such private programs can never have as far a reach as the education system itself, and it is therefore important for the Ministry of Education to find a more practical way to include AIDS education in the curriculum. This is, of course, a complex and controversial subject, and it is not within the scope of this paper to do it justice.

## **V. Dealing with HIV/AIDS: Coping Mechanisms for the Education Sector**

The kinds of impacts of the AIDS epidemic discussed in previous sections can affect the three cornerstones of the education system, namely quality, access, and attendance. The most obvious effect is the impact on pupil-teacher ratios, often the central quality-measure targeted by education ministries. The effect of epidemic on the age structure of populations is likely in some countries to set that target back many years. Furthermore, the loss of experience embodied in teachers who are lost to the disease represents an aspect of human capital that will be impossible to replace in the short run. Perhaps even more critically, the loss of teachers in small schools will threaten access for students, especially in rural areas where it is difficult to find replacements.

Attendance is affected both directly and indirectly as a result of AIDS-related morbidity and mortality. As described in Section II, children orphaned by the disease will in many cases simply drop out, as they can no longer afford to attend school. In cases where caretaking responsibilities fall on students, absenteeism is likely to increase, and studies have shown that children who are excessively absent from school tend to perform poorly and drop out prematurely.<sup>19</sup> Studies have also shown that the quality of education influences attendance. For example, a World Bank study in the Philippines showed that the number of students completing the primary grade cycle increases as the school environment improves, as measured by the cognitive achievement of the learners.<sup>20</sup> The impacts of the disease on quality through such factors as increased teacher absenteeism and increased class size can therefore also lower attendance.

It is of paramount importance that education ministries incorporate the effects of the crisis into their long-term planning in order to minimize the negative consequences on educational

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<sup>19</sup> Weitzman 1997.

<sup>20</sup> Lockheed and Verspoor 1991.

outcomes. This crisis will, of course, be developing at a time when the impacts of the epidemic will be manifest in every sector. AIDS will result in a loss of experienced personnel throughout the economy, a decline in government resources as taxable incomes decline, and an increased demand for resources in the health sector. Furthermore, some resources within the education sector itself will be diverted toward health care and pensions of infected teachers and personnel. The resource constraint faced in the education sector is therefore likely to be even more binding, and it will be necessary to develop cost-effective strategies to maintain access, attendance, and quality within education systems.

The most natural response to a projected loss in teaching personnel is to train more teachers. To the extent that this strategy is followed it is important that certain issues be kept in mind. First, teachers are resistant to being moved far away from their homes. Therefore, coping with the increased loss of teachers in regions that are worst hit by the epidemic will be facilitated if there are an increased number of teachers being trained from these regions. Preferential admission into teacher training colleges or other incentives should be considered for such candidates. If teachers are going to be placed away from their homes, it is important, in order to control the spread of the disease, that they be provided with appropriate housing so that they can bring their families with them.

While increasing the supply of teachers is the most direct response to the loss of teachers to the epidemic, it is not necessarily the most cost-effective. Indeed, training new teachers is extremely costly, and lowering class size can be a very expensive way to raise education quality. Furthermore, the benefits of reducing class size to within a certain range are not obvious. Numerous studies have looked at the impact of educational inputs.<sup>21</sup> An overview of these studies by Fuller and Clarke (1994) finds that average class size is significant in only nine out of twenty-six studies in primary schools and in two out of twenty-two studies in secondary schools.

Class size does appear to have an impact on time-on-task, an important contributor to achievement outcomes. Lockheed and Verspoor (1991) maintain that in a class with five students, time-on-task is 90 percent, falling to 61 percent in a class of twenty. When class size increases to one hundred, it declines to 12 percent. Moreover, classes above fifty tend to become unruly and to emphasize rote learning. However, reducing a class from forty-five to thirty students appears to have little effect on achievement. Significant improvements in achievement do not appear to occur until class sizes fall below twenty students. This is, however, an extremely expensive way to raise achievement, and given the increased resource constraints in the face of the epidemic, it might be wise to focus elsewhere.<sup>22</sup>

Studies of the effects of educational inputs on achievement find that there are other inputs that fare much better in cost-effectiveness terms than lowering class size. Perhaps the most consistent finding is the importance of textbooks and other instructional materials. A World Bank study in the Philippines assessed the impact on achievement of introducing textbooks in math, science, and Filipino, and ensuring a ratio of two pupils per textbook. Achievement improvements were estimated to be twice those that would have been gained by reducing pupil-teacher ratios from

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<sup>21</sup> Fuller 1987.

<sup>22</sup> Lockheed and Verspoor 1991.

40:1 to 10:1.<sup>23</sup> This outcome is of course most likely to be true in situations where the baseline is low. In the Philippine study it was found that further raising the ratio of textbooks to students to 1:1 had no significant effect on achievement. However, a wide range of studies in developing countries have supported the finding that increased textbooks are an important contributing factor, indicating that in most developing countries baseline levels are such that this represents a cost-effective approach to improving quality.<sup>24</sup> Furthermore, it has been shown that increasing textbooks has the greatest impact on poor children, who will of course be the ones most affected by this crisis.<sup>25</sup>

While textbooks are undoubtedly the most important development material, as they are the basis for delivering curriculum, other teaching materials have also been found to be important in raising achievement. For example, teaching guides, supplementary readers, exercise books, and instructional materials have all been shown to be effective. Another increasingly promising approach has been the use of interactive instructional media, primarily interactive radio instruction. This approach uses a radio broadcast directly into the classroom, and can, to some extent, substitute for the teacher. While it requires highly coordinated instructional materials and delivery strategy, the need for teacher training is minimal, and it is therefore highly cost-effective.<sup>26</sup>

Both formal education and training of teachers can also be important contributors. Studies have shown that it is important that teachers have a formal education at a level higher than the students they are teaching.<sup>27</sup> For example, a study in Pakistan found that students of teachers with a secondary education did better in English and math than those of teachers with only a primary education. However, while a teacher's knowledge of the subject matter is an important contributor, the returns to having a university education when teaching primary school appear to be low. The evidence on the effects of pre-service teacher training is more mixed, with some studies finding a positive effect, especially where teacher quality is highly variable, while others find that it is a much smaller contributor that teacher's knowledge of subject matter. In-service training has been found to be effective when it interacts with prior education and training.<sup>28</sup>

Another important contributor to achievement outcomes is time-on-task. Fuller and Clarke (1994) find that even gross indicators of instructional time are consistently related to achievement in developing countries. In a study of five developing countries, Jimenez and Lockheed (1995) explore achievement differences between private and public schools, and find that the longer school year in private schools is a significant explanatory variable. Extending the school year or requiring that priority be given to maintaining minimum instruction in core subjects is therefore an important policy tool.

Education ministries thus have access to a range of policy options to maintain achievement in the face of large losses of experienced teaching personnel to HIV/AIDS. The correct mix of policy

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<sup>23</sup> Fuller and Clarke 1994.

<sup>24</sup> Harbison and Hanushek 1992, Jamison et al. 1981.

<sup>25</sup> Heyneman, Farrel, and Sepulveda 1978.

<sup>26</sup> Fuller and Clarke 1994; Lockheed and Verspoor 1991.

<sup>27</sup> Ibid.

<sup>28</sup> Fuller and Clarke 1994, Harbison and Hanushek 1992.

options will naturally depend on baseline input levels, as the rate of return will be higher for those inputs with the lowest baseline levels. The rate of return on each input will need to be compared with its cost in order to develop the most cost-effective policy interventions. While appropriate interventions will differ in each country based on these considerations, there are two models of successful educational programs that may prove useful in thinking about developing educational policy in resource-constrained situations. The first, called Escuela Nueva, is a model of multigrade teaching that has been employed with extremely positive results in Colombia's rural educational system. The second is the model developed by the Bangladesh Rural Advancement Committee (BRAC), a nongovernmental organization in Bangladesh that has set up a network of rural schools, providing access where the public system has been unable. Both these models are particularly important to consider in situations where access is threatened, such as in the case of rural areas currently served by one- or two-teacher schools.

A system of multigrade teaching allows one teacher to teach students at different levels and ages concurrently. In order for such a system to be effective it is necessary to develop a very structured curriculum with highly developed learning guides and teaching materials, such as instructor manuals and student workbooks, on which the teacher can rely. While the Colombian experience has shown that such a system can be highly effective, its success depends on training teachers in the appropriate skill set necessary for this approach. For example, teachers need to be well trained in the effective use of the learning materials provided and in the necessary classroom-management skills. The focus in such a system, however, is shifted toward the use of teaching materials, a shift that may be increasingly necessary in the face of large losses in human capital.

The BRAC nonformal primary education program in Bangladesh was developed to provide access to children in rural areas who were not enrolled in government schools. Teachers in BRAC schools are selected from the village itself, and they are required to have at least a ninth-grade education. Selection is based on literacy, numeracy, presence, and the ability to articulate and interact with children. Teachers are provided with a brief pre-service training on basic concepts of learning theory, and are made very familiar with the teaching materials. There is a strong focus on the development of a highly structured curriculum and effective teaching materials such as books, workbooks, accompanying notes, and teaching aids. Regular and ongoing in-service training is available.<sup>29</sup> BRAC's program has proved extraordinarily successful, with very low dropout rates and a significant percentage of students joining government secondary schools after graduation. While privately provided education systems should not be expected to substitute for government systems, the BRAC system does show that it is possible to quickly but effectively train para-professional teachers if there is strong support in the form of effective teaching materials and structured systems.<sup>30</sup>

## **VI. Conclusion**

The magnitude of the HIV/AIDS epidemic in the most affected countries of sub-Saharan Africa is such that it will affect practically every aspect of social and economic existence. While AIDS is primarily a health problem, its impacts will be felt on the economy through the loss of human capital. The role of the education sector is particularly important in moderating some of the long-

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<sup>29</sup> Lovell and Fatema 1989.

<sup>30</sup> Ibid.

term negative consequences of the disease, as it is the primary mechanism for the development of tomorrow's human capital resources. It is critical, therefore, that governments implement policies to cope with the potentially large-scale impacts of the disease on the education sector itself.

It is necessary when considering policy options to assess the impact of various mechanisms on the three cornerstones of the education system: access, attendance, and quality. This study has explored the potential impact of the crisis on each of these factors, and has discussed the effects of possible coping mechanisms in mitigating some of these effects. In evaluating these policy options it will be essential to keep in mind issues of cost-effectiveness, as resource constraints are likely to become ever more binding in the face of the epidemic.

While we have provided a framework within which to assess the needs of the education sector as AIDS morbidity and mortality rates increase, in order to conduct a full assessment it will be necessary to gather far more detailed data on the impacts of the crisis. For example, while there is an increasing amount of anecdotal evidence on the societal burden of AIDS orphans, there are few systematic studies that assess the true effects. An increased emphasis on gathering data is an essential next step in dealing with the impacts of the crisis.

Finally, one of the most striking results to emerge from the focus group discussion conducted with teachers was the resistance to discussing the matter of AIDS except in the most abstract terms. The intense stigma associated with the AIDS presents a significant problem not only in terms of controlling the spread of the disease, but also in that it limits the effectiveness with which individuals and communities can respond to the disease. If AIDS orphans are shunned it limits their ability to become productive members of society, transmitting the problem to the next generation. If infected teachers are ostracized, it further shortens their productive lives. Bringing communities to the stage where they can deal openly with the issues raised by the disease will mean that they can be at the heart of developing effective coping mechanisms to limit the long-term negative consequences of the AIDS epidemic.

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## Appendix I: Part A

### WITHOUT-AIDS SCENARIO

#### Primary

			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Population Age 6</b>			54530	57900	61200	62010	62690	63240	63650	63960	64550	65090	65590
<b>Gross Enrollment Ratio</b>			118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%
<i>Grade 1</i>													
Repetition Rate	13.3%	New Entrants	68322	72216	73172	73974	74623	75107	75473	76169	76806	77396	77951
Promotion rate	83.6%	Repeaters	9775	10387	10986	11193	11327	11431	11510	11569	11669	11767	11859
Dropout Rate	3.1%	Total	78097	82603	84158	85167	85950	86538	86982	87738	88475	89163	89810
<i>Grade 2</i>													
Repetition Rate	10.1%	New Entrants	61444	65289	69056	70356	71200	71855	72346	72717	73349	73965	74541
Promotion rate	87.5%	Repeaters	6411	6853	7286	7711	7885	7988	8064	8121	8165	8233	8302
Dropout Rate	2.4%	Total	67855	72142	76342	78067	79085	79842	80410	80839	81513	82198	82843
<i>Grade 3</i>													
Repetition Rate	12.0%	New Entrants	55542	59373	63125	66800	68308	69199	69862	70359	70734	71324	71923
Promotion rate	85.6%	Repeaters	6984	7503	8025	8538	9041	9282	9418	9514	9585	9638	9715
Dropout Rate	2.4%	Total	62526	66876	71150	75338	77349	78481	79280	79872	80319	80962	81639
<i>Grade 4</i>													
Repetition Rate	17.8%	New Entrants	49819	53522	57246	60904	64489	66211	67180	67863	68371	68753	69304
Promotion rate	77.5%	Repeaters	10513	10739	11438	12226	13017	13796	14241	14493	14659	14779	14869
Dropout Rate	4.7%	Total	60332	64261	68684	73130	77506	80007	81421	82356	83030	83532	84173
<i>Grade 5</i>													
Repetition Rate	12.3%	New Entrants	45772	46757	49802	53230	56676	60067	62005	63101	63826	64348	64737
Promotion rate	82.5%	Repeaters	7110	6504	6551	6931	7400	7881	8358	8655	8826	8936	9014
Dropout Rate	5.2%	Total	52882	53262	56354	60162	64076	67949	70363	71756	72652	73285	73751
<i>Grade 6</i>													
Repetition Rate	9.9%	New Entrants	47686	43628	43941	46492	49633	52862	56058	58049	59198	59938	60460
Promotion rate	83.7%	Repeaters	5017	5218	4836	4829	5081	5417	5770	6121	6353	6490	6576
Dropout Rate	6.4%	Total	52702	48845	48777	51321	54714	58279	61827	64170	65551	66427	67036
<i>Grade 7</i>													
Repetition Rate	11.6%	New Entrants	42413	44112	40883	40826	42955	45796	48780	51749	53711	54866	55600
Promotion rate	80.3%	Repeaters	5383	5544	5760	5411	5363	5605	5962	6350	6740	7012	7178
Dropout Rate	8.1%	Total	47796	49656	46643	46237	48319	51401	54742	58099	60450	61879	62778
<b>Total Enrollments</b>			<b>459453</b>	<b>476026</b>	<b>491982</b>	<b>506875</b>	<b>524127</b>	<b>541296</b>	<b>556300</b>	<b>568788</b>	<b>578645</b>	<b>585988</b>	<b>591717</b>

#### Secondary

Admission Rate			76.2%	76.2%	76.2%	76.2%	76.2%	76.2%	76.2%	76.2%	76.2%	76.2%	76.2%
<i>Grade 8</i>													
Repetition Rate	13.6%	New Entrants	26871	28394	29246	30384	28540	28292	29566	31451	33496	35550	36989
Promotion rate	76.6%	Repeaters	3605	4145	4425	4579	4755	4528	4463	4628	4907	5223	5545
Dropout Rate	9.8%	Total	30476	32539	33671	34963	33295	32820	34029	36079	38403	40773	42534
<i>Grade 9</i>													
Repetition Rate	11.3%	New Entrants	20304	23345	24925	25792	26782	25504	25140	26066	27637	29416	31232
Promotion rate	80.5%	Repeaters	2596	2588	2930	3148	3270	3396	3266	3210	3308	3497	3719
Dropout Rate	8.2%	Total	22900	25932	27855	28940	30052	28900	28406	29276	30945	32913	34951
<i>Grade 10</i>													
Repetition Rate	16.4%	New Entrants	18490	18434	20876	22424	23297	24192	23265	22867	23567	24911	26495
Promotion rate	54.4%	Repeaters	4208	3722	3634	4020	4337	4532	4711	4588	4503	4603	4840
Dropout Rate	29.2%	Total	22698	22157	24509	26443	27633	28724	27975	27455	28070	29514	31335
<i>Grade 11</i>													
Repetition Rate	0.5%	New Entrants	13957	12348	12053	13333	14385	15032	15626	15219	14935	15270	16056
Promotion rate	93.9%	Repeaters	68	70	62	61	67	72	76	79	76	75	77
Dropout Rate	5.6%	Total	14025	12418	12115	13394	14452	15105	15701	15297	15012	15345	16132
<i>Grade 12</i>													
Repetition Rate	0.2%	New Entrants	12740	13170	11660	11376	12577	13570	14183	14743	14364	14096	14409
Promotion rate	99.8%	Repeaters	25	26	26	23	23	25	27	28	30	29	28
Dropout Rate	0.0%	Total	12765	13195	11687	11400	12599	13596	14211	14772	14394	14125	14437
<b>Total Enrollments</b>			<b>102864</b>	<b>106242</b>	<b>109838</b>	<b>115140</b>	<b>118032</b>	<b>119144</b>	<b>120322</b>	<b>122879</b>	<b>126823</b>	<b>132670</b>	<b>139390</b>

**WITH-AIDS SCENARIO**

**Primary**

			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Population Age 6</b>			54620	57010	57070	56650	56040	55240	54270	53490	52660	51810	50950
<b>Gross Enrollment Ratio</b>			117%	117%	117%	117%	117%	116%	116%	116%	116%	116%	115%
<i>Grade 1</i>													
Repetition Rate	13.3%	New Entrants	64142	66873	66817	66200	65364	64310	63062	62059	61001	59923	58837
Promotion rate	83.6%	Repeaters	9288	9766	10193	10242	10167	10046	9889	9702	9544	9383	9218
Dropout Rate	3.1%	Total	73430	76639	77010	76443	75531	74356	72951	71761	70545	69306	68054
<i>Grade 2</i>													
Repetition Rate	10.1%	New Entrants	58380	61387	64070	64380	63906	63144	62161	60987	59992	58976	57939
Promotion rate	87.5%	Repeaters	6159	6519	6858	7164	7226	7184	7103	6996	6866	6753	6639
Dropout Rate	2.4%	Total	64540	67906	70929	71544	71132	70328	69264	67983	66859	65728	64578
<i>Grade 3</i>													
Repetition Rate	12.0%	New Entrants	53360	56472	59418	62063	62601	62241	61537	60606	59485	58501	57512
Promotion rate	85.6%	Repeaters	6815	7221	7643	8047	8413	8522	8491	8403	8281	8132	7996
Dropout Rate	2.4%	Total	60175	63693	67061	70110	71014	70762	70029	69010	67766	66633	65508
<i>Grade 4</i>													
Repetition Rate	17.8%	New Entrants	48611	51509	54521	57404	60014	60788	60573	59945	59072	58008	57038
Promotion rate	77.5%	Repeaters	10513	10524	11042	11670	12295	12871	13111	13116	13005	12830	12609
Dropout Rate	4.7%	Total	59124	62033	65563	69074	72309	73659	73684	73060	72077	70838	69647
<i>Grade 5</i>													
Repetition Rate	12.3%	New Entrants	45772	45821	48076	50812	53533	56040	57086	57105	56622	55860	54899
Promotion rate	82.5%	Repeaters	7110	6504	6436	6705	7075	7455	7810	7982	8006	7949	7849
Dropout Rate	5.2%	Total	52882	52325	54512	57517	60607	63494	64896	65087	64628	63809	62748
<i>Grade 6</i>													
Repetition Rate	9.9%	New Entrants	47686	43628	43168	44972	47451	50001	52383	53539	53697	53318	52642
Promotion rate	83.7%	Repeaters	5017	5218	4836	4752	4923	5185	5463	5727	5867	5897	5862
Dropout Rate	6.4%	Total	52702	48845	48004	49725	52374	55186	57846	59266	59564	59215	58505
<i>Grade 7</i>													
Repetition Rate	11.6%	New Entrants	42413	44112	40883	40179	41620	43837	46191	48417	49605	49855	49563
Promotion rate	80.3%	Repeaters	5383	5544	5760	5411	5288	5441	5716	6021	6315	6487	6536
Dropout Rate	8.1%	Total	47796	49656	46643	45590	46908	49278	51907	54438	55920	56342	56098
<b>Total Enrollments</b>			<b>447911</b>	<b>459478</b>	<b>469596</b>	<b>477457</b>	<b>486485</b>	<b>494731</b>	<b>500148</b>	<b>502287</b>	<b>501073</b>	<b>496775</b>	<b>490381</b>

**Secondary**

<b>Admission Rate</b>			76.2%	76.2%	76.2%	76.2%	76.2%	76.2%	76.2%	76.2%	76.2%	76.2%	76.2%
<i>Grade 8</i>													
Repetition Rate	13.6%	New Entrants	26871	28394	29246	30384	28540	27896	28702	30153	31761	33310	34217
Promotion rate	76.6%	Repeaters	3605	4145	4425	4579	4755	4528	4410	4503	4713	4961	5205
Dropout Rate	9.8%	Total	30476	32539	33671	34963	33295	32424	33112	34656	36474	38271	39422
<i>Grade 9</i>													
Repetition Rate	11.3%	New Entrants	20304	23345	24925	25792	26782	25504	24837	25364	26546	27939	29315
Promotion rate	80.5%	Repeaters	2596	2588	2930	3148	3270	3396	3266	3176	3225	3364	3537
Dropout Rate	8.2%	Total	22900	25932	27855	28940	30052	28900	28103	28539	29771	31303	32853
<i>Grade 10</i>													
Repetition Rate	16.4%	New Entrants	18490	18434	20876	22424	23297	24192	23265	22623	22974	23966	25199
Promotion rate	54.4%	Repeaters	4208	3722	3634	4020	4337	4532	4711	4588	4463	4500	4668
Dropout Rate	29.2%	Total	22698	22157	24509	26443	27633	28724	27975	27211	27437	28466	29868
<i>Grade 11</i>													
Repetition Rate	0.5%	New Entrants	13957	12348	12053	13333	14385	15032	15626	15219	14803	14926	15485
Promotion rate	93.9%	Repeaters	68	70	62	61	67	72	76	79	76	74	75
Dropout Rate	5.6%	Total	14025	12418	12115	13394	14452	15105	15701	15297	14879	15000	15560
<i>Grade 12</i>													
Repetition Rate	0.2%	New Entrants	12740	13170	11660	11376	12577	13570	14183	14743	14364	13971	14085
Promotion rate	99.8%	Repeaters	25	26	26	23	23	25	27	28	30	29	28
Dropout Rate	0.0%	Total	12765	13195	11687	11400	12599	13596	14211	14772	14394	14000	14113
<b>Total Enrollments</b>			<b>102864</b>	<b>106242</b>	<b>109838</b>	<b>115140</b>	<b>118032</b>	<b>118748</b>	<b>119102</b>	<b>120475</b>	<b>122955</b>	<b>127040</b>	<b>131815</b>

## Appendix I: Part B

### Teacher Template

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Without AIDS Scenario</b>											
Primary Student Enrollment	459453	476026	491982	506875	524127	541296	556300	568788	578645	585988	591717
Secondary Student Enrollment	102864	106242	109838	115140	118032	119144	120322	122879	126823	132670	139390
Teacher need, Prim (PTR 34:1)	13513	14001	14470	14908	15415	15920	16362	16729	17019	17235	17403
Teacher need, Sec. (PTR 28:1)	3674	3794	3923	4112	4215	4255	4297	4389	4529	4738	4978
Total teachers needed	17187	17795	18393	19020	19631	20176	20659	21118	21548	21973	22382
Non-death attrition rate = 6.3%	1064	1054	1046	1038	1030	1024	1017	1012	1007	1002	998
Death rate, 20-59	0.0052	0.0051	0.0049	0.0048	0.0047	0.0046	0.0044	0.0044	0.0043	0.0042	0.0041
Attrition due to death	88	85	81	79	77	75	71	71	69	67	66
Number of new teachers	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Total number of teachers	16889	16737	16597	16470	16354	16247	16148	16060	15977	15902	15834
Teacher Shortfall	298	1058	1795	2550	3277	3929	4511	5058	5571	6071	6548
<b>With AIDS Scenario</b>											
Primary Student Enrollment	447911	459478	469596	477457	486485	494731	500148	502287	501073	496775	490381
Secondary Student Enrollment	102864	106242	109838	115140	118032	118748	119102	120475	122955	127040	131815
Teacher need, Prim (PTR 34:1)	13174	13514	13812	14043	14308	14551	14710	14773	14737	14611	14423
Teacher need, Sec. (PTR 28:1)	3674	3794	3923	4112	4215	4241	4254	4303	4391	4537	4708
Total teachers needed	16848	17308	17734	18155	18524	18792	18964	19076	19129	19148	19131
Non-death attrition rate = 6.3%	1061	1025	988	952	918	886	856	827	801	777	754
Death rate, 20-59	0.031	0.034	0.037	0.039	0.041	0.042	0.044	0.045	0.046	0.047	0.048
Attrition due to death	522	553	580	590	598	590	598	591	585	579	575
Number of new teachers	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Total number of teachers	16846	16262	15685	15117	14575	14059	13583	13129	12711	12326	11970
Teacher Shortfall	2	1046	2049	3038	3949	4733	5381	5946	6417	6822	7161